

CLAIMS

1. A light-emitting transistor, which is characterized in that it comprises:
 - a) a gate electrode covered with an insulating film;
 - 5 b) a first source/drain electrode provided on the insulating film and made of an electron-injecting material whose work function is equal to or lower than 4.26 electron-volts;
 - c) a second source/drain electrode provided separately from the first source/drain electrode on the insulating film and made of a hole-injecting material whose work function is higher than 4.26 electron-volts; and
 - 10 d) a light-emitter layer provided on the insulating film between the first source/drain electrode and the second source/drain electrode and made of an organic semiconductor.
2. The light-emitting transistor according to claim 1, which is characterized in that each of the first source/drain electrode and the second source/drain electrode has a
15 layered structure in which the electron-injecting material and the hole-injecting material are stacked in a same order.
3. The light-emitting transistor according to claim 1, which is characterized in that the second source/drain electrode includes an adhesive base layer made of the
20 electron-injecting material and covered with the hole-injecting material.
4. The light-emitting transistor according to claim 1, which is characterized in that the first source/drain electrode includes an adhesive base layer made of the hole-injecting material and covered with the electron-injecting material.

5. The light-emitting transistor according to one of claims 1 to 4, which is characterized in that the electron-injecting material is aluminum, magnesium, calcium, magnesium-silver alloy, or a combination of two or more of these materials.

5 6. The light-emitting transistor according to one of claims 1 to 5, which is characterized in that the hole-injecting material is gold, platinum, indium tin oxide, chromium, nickel or a combination of two or more of these materials.

7. The light-emitting transistor according to one of claims 1 to 6, which is
10 characterized in that the light-emitter layer includes a light emitter in which a material of an area that is in contact with the first source/drain electrode is different from that of another area that is in contact with the second source/drain electrode, and the area on the side of the first source/drain electrode is made of an electron transport material and the area on the side of the first source/drain electrode is made of a hole transport material.

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8. The light-emitting transistor according to one of claims 1 to 7, which is characterized in that the thickness of the insulating film satisfies a condition for an interference condition for an emission wavelength of the light emitter layer.

20 9. A laser light source, which is characterized in that it comprises:

a) a gate electrode covered with an insulating film;

b) a first source/drain electrode provided on the insulating film and made of an electron-injecting material whose work function is equal to or lower than 4.26 electron-volts;

c) a second source/drain electrode provided separately from the first source/drain
25 electrode on the insulating film and made of a hole-injecting material whose work function is

higher than 4.26 electron-volts;

d) a light-emitter layer provided between the first source/drain electrode and the second source/drain electrode and made of an organic semiconductor; and

e) a diffraction grating provided between the first source/drain electrode and the
5 second source/drain electrode in order to diffract light emitted from the light-emitter layer.

10. The laser light source according to claim 9, which is characterized in that the diffraction grating is formed on the gate electrode the first source/drain electrode and the second source/drain electrode.

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11. A laser light source, which is characterized in that it comprises:

a) a gate electrode covered with an insulating film;

b) a comb-shaped first source/drain electrode provided on the insulating film and made of an electron-injecting material whose work function is equal to or lower than 4.26

15 electron-volts;

c) a second source/drain electrode, consisting of a comb-shaped electrode made of a hole-injecting material whose work function is higher than 4.26 electron-volts, which is provided on the insulating film and arranged so that its comb-teeth engage into the comb-teeth of the aforementioned drain electrode to form a diffraction grading consisting of

20 said two sets of comb-teeth; and

d) a light-emitter layer provided between the first source/drain electrode and the second source/drain electrode and made of an organic semiconductor.

12. A laser light source, which is characterized in that it comprises:

25 a) a gate electrode covered with an insulating film;

b) a first source/drain electrode provided on the insulating film and made of an electron-injecting material whose work function is equal to or lower than 4.26 electron-volts;

c) a second source/drain electrode provided separately from the first source/drain electrode on the insulating film and made of a hole-injecting material whose work function is
5 higher than 4.26 electron-volts;

d) a light-emitter layer provided between the first source/drain electrode and the second source/drain electrode and made of an organic semiconductor; and

e) a dielectric multi-layer film provided on an optical path from the light-emitter layer to an outside, which causes an interference of light having a predetermined wavelength
10 within an emission band of the light-emitter layer.